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ABSTRACT

Results of a seventh-grade teaching team's 2-week exercise based on the videotape series "Voyage of the Mimi" are explored. The series describes a scientific expedition by a racially, ethnically, and gender mixed crew to study humpback whales off the coast of Maine. The following questions were examined: (1) whether the series could be incorporated successfully into interdisciplinary teaching and the standards of the school district; (2) whether the students would learn, or merely be entertained; and (3) whether the program would have positive effects on the mathematics and science attitudes of female students. Students (n=125) in three ability groups watched the series daily, after which it was used as an anchor or theme for a lesson. A post-exercise test examined student attitudes. Teachers reported that they were able to integrate the "Mimi" material into their lessons and that students were enthusiastic. An analysis of student papers indicated that they dealt with important concepts, and that they learned from the exercises. No changes were seen in student attitudes toward mathematics and science, but these attitudes were favorable from the start. The lack of difference between genders may be explained by the background of the students, most of whom were from college faculty or professional families. The implications for instruction are discussed. One table summarizes student attitudes, and five student drawings are included. (Contains 14 references.) (SLD)

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ED 363 306

Interdisciplinary, Anchored Instruction Using Videotape

by
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The presence of the VCR in the classroom is now a fact of life. Strohmer (1989) reports that the use of video is coming of age. Learning outcomes are also changing, says Strohmer. Teachers are not looking at simple stimulus-response types of learning. She says they are seeing themselves more as facilitators who equip students to think throughout life. Strohmer says that "instead of focusing on facts that must be gotten across, designers are grappling with modeling processes and encouraging thinking" (p. 27).

This study explores the results of a seventh grade teaching team's two-week exercise based on the videotape series *Voyage of the Mimi*. The videotapes provide for the thematic integration of full motion video, print materials, and computer programs. The series consists of 26, 15-minute segments about a scientific expedition to study Humpback Whales off of the Coast of Maine. The crew is headed by a female biologist who is awarded a grant to study whales. Among the racially, ethnically, and gender-mixed crew, are a crusty sea captain, his 11-year old grandson, an oceanographer, a hearing impaired research assistant, and two teenagers.

Literature about this highly popular and visible series is limited--especially research reports concerning its effectiveness. The available information, while anecdotal in nature, is generally favorable. Mastrolia (1991) states that "...there is enough variety and interest so that any student would become actively involved with learning..." (p. 31). An article in *High Technology* ("Grade Schoolers", 1985) cites a math teacher in Cambridge, MA who states: "The program is stimulating and practically limitless in its usefulness" (p. 58). The latter article also suggests that the Mimi series causes female students "to view math and science as both fascinating and accessible" (p. 59).

By Michaela Myers, 7th Grade

Martin (1988) states that the Mimi materials "could create windows of opportunity in which disruption in instructional routines occurred and could be utilized to open a lesson up in positive ways" (p. 6). Not all reviews, however, have been favorable.

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Critique of the Mimi

In reviewing the *Voyage of the Mimi*, Postman (1985) states that "media merchants" have created a mindless series, "as if media themselves have no epistemological or political agenda" (p. 154). He undermines a selling point often found in multimedia literature by discounting suggestions that dramatic settings facilitate learning. In addition, he questions why children should be studying Humpback Whales, navigation, and map-reading skills. He opines that the subject matter is highly inappropriate. In short, he suggests that children will only have learned that learning is a form of entertainment. While Mimi advocates will no doubt suffer chagrin at Postman's remarks, he has done the community a favor. His concerns, like those of Clark (1983), cause us to look closely at important and fundamental issues concerning the use of instructional technology.

By Erin Knocke, 7th Grade

Background

Videotape Usage

In a review of electronic learning research, Johnston (1987), suggests that television supports instruction when teachers provide an interface between the program and learners. According to Johnston, factors contributing to success include support materials and an adult who can extend the lesson. He shows one study that resulted in a significant change in females' attitudes about stereotypical gender roles. Even though Johnston cites meta-analyses which show little effect size from the use of instructional television, he states that visual-based instruction has at least "...enabled the classroom to be extended beyond the institutional walls" (p. 51). He cites modeling as a contextual factor influencing a viewer's attention and comprehension.

Modeling

Strohmer (1989) says that models within the format of instructional television play an important role in whether or not learners will process information instead of just passively watching. Human models, she says, are generally more effective--especially a model with whom young viewers can identify or admire. This comment is appropriate to the Mimi series because the developers purposely wanted to show attractive and interesting people engaged in interesting real-world work.

The real-world aspect is important. This paper suggests that one of the defining values of the Mimi series lies in the use of "situated cognition" or "anchored instruction." Both are methods designed to provide life-like environments that show students the importance, application, and relevance of the subject domain.

Anchored Instruction

Gardner (1991) and Bigge (1976) remind their readers that before formal schooling, children learn everyday tasks at a prodigious rate--seemingly with ease and enjoyment. After entering formal educational environments, however, many of the same children find learning difficult--if not downright boring and painful. Bigge points out that students often fail to find or understand the relevance of school subjects to everyday life. The Cognition and Technology Group at Vanderbilt (CTGV, 1990) states that instead of relevance, schools promote the learning of inert knowledge. Inert knowledge is defined as knowledge

learned, but often forgotten in appropriate situations.

How could learning in an appropriate context affect the learning process? Brown, Collins, and Duguid (1989) contend that students need more than abstract concepts and canned examples. They suggest that learning should be conducted in activity situated in real-life social, cultural, and physical contexts. It might be impractical, however, to take every middle schooler on a converted tuna trawler to study the habits of Humpback Whales. To get around this problem, Brown, Collins, and Duguid suggest a concept termed "legitimate peripheral participation" (p. 40). This concept applies to persons not taking direct part in an activity, yet still learning a great deal from their peripheral position. With little imagination, this concept could be likened to middle school students viewing the videotape of the Mimi's voyage, then engaging in activities similar to--or congruent with those depicted in the series. Research conducted by the Cognition and Technology Group at Vanderbilt (CTGV, 1990) is a good example of the use of media (videodisc) to "situate" or "anchor" the students within a learning environment.

CTGV submits that new information learned during meaningful activity is perceived as a tool rather than as inert information. They attempt to attack the inert information problem with video environments supportive of sustained exploration. According to them, this sustained exploration allows multiple perspectives and permits opportunities for teacher guided discovery. Their problem solving macrocontexts help students develop tools that form new, as well as modify old perceptions. This is in contrast to traditional instruction that emphasizes mere facts to be memorized. It is suggested that the dramatic series in the *Voyage of the Mimi* videotapes also creates an environment for sustained exploration through relevant tool building activities.

Purpose and Rationale

This study looked at a variety of issues. First, could a seventh grade team currently teaching separate subjects using behavioral or traditional methods effectively use an anchored series in an interdisciplinary mode? Second, could the *Voyage of the Mimi* series be effectively integrated into the school district's standards of learning? Third, were the students learning or only being entertained? Last, in a more quantitative vein, it was hypothesized that female students would come to view math and science more favorably.

Methods

An extant seventh grade class of one hundred and twenty-five students served as participants during the two-week exercise. This particular class was divided into three ability levels (Level 1 denoted those of the highest ability). Each morning the students reported to their home rooms. They viewed one or two of the 13, 15-minute, Mimi episodes. There were little or no previewing discussions, organizers, or questions for the students to consider. After viewing, the students immediately left for their regular classes. Traditionally, the students' day would take them through the four primary classrooms in which they studied English, social studies and geography, math, and science. During the exercise, however, each of the four primary teachers used the Mimi series as the anchor or theme under which lessons were conducted.

A variety of methods was used to assess the exercise. The students completed pre and post exercise surveys. There were five short-answer and 20 Likert scale questions designed to measure the students' attitudes about math and science. Interviews, observation, and assessment of student projects supplemented the surveys.

Table 1

Is math a subject you like or dislike?

Levels: / Gender:	1 Female	1 Male	2 Female	2 Male	3 Female	3 Male
Pre test						
Like	24	19	20	20	6	4
Dislike	2	1	2	2	3	0
Post test						
Like	28	19	21	25	7	5
Dislike	1	1	1	0	0	0

Is science a subject you like or dislike?

Levels: / Gender:	1 Female	1 Male	2 Female	2 Male	3 Female	3 Male
Pre test						
Like	17	17	13	13	3	1
Dislike	6	4	6	10	7	4
Post test						
Like	18	17	11	17	3	3
Dislike	6	4	10	8	4	1

Results

The post exercise questionnaire was administered two weeks after the series. Of the 20 questions using a Likert scale, none showed significant changes in attitude. It may be of interest to note, however, that we had assumed there would be significant gender-related differences concerning math and science reflected on the *pre-exercise* survey. This was not the case. Table 1 shows the results of two of the short answer questions. While there was no significance, there were some subtle changes, especially in the Level 3 students. The reader can note little difference in scores based on gender. One might also surmise that the math (or perhaps the math teacher) class was well liked--both before and after the exercise.

While quantitative results were not significant, the other indicators were positive. Postman was right, the students had fun, but so did the teachers. One teacher remarked that disciplinary problems were down and that students were so involved in the exercise, they were bringing items from home to support the theme. One female student became a local celebrity when she reported on visiting a huge marine museum in California. Others were bringing periodicals such as the *National Geographic*. Their intent was to share and show off articles concerning whales, fishing, and of course--the Titanic. Place mats from Nantucket were soon gracing the walls along with the Mimi posters. Another teacher remarked that the Mimi materials provided a wonderful opportunity to go into so many

different areas. In short, exposure to the series provided detailed orientations to topics students could study in greater depth off-line. Instead of being the experts, teachers became facilitators, coordinators, and mentors in guiding the students to critically analyze content.

Can this series be effectively integrated into a curriculum driven by behavioral objectives and standards of learning? During a post-exercise interview, each team member discussed plans for expansion of and further experimentation with his or her methodology in implementing the Mimi series. The math instructor wanted to move from a basic map and navigation course to one that incorporates actual orienteering exercises to be held on the school grounds. The other three teachers envisioned more of a constructivist approach in which cooperative learning played a greater role. It was this writer's impression that the teachers first hand experience with the series will allow them to expand the content or create supplemental activities congruent with the series. This will facilitate a closer fit between the curriculum and the Mimi series.

By Lorena Maria Aquirre, 7th Grade

One very important issue remains: were the students learning? In addition to anecdotal information, the students turned in end-of-exercise papers that resembled portfolios. An analysis of these papers showed that the students were wrestling with important concepts. Examples included, but were not limited to: human interaction with the environment--especially concerning endangered species; the social dynamics among the ship's crew members; the nature of variables dealt with by people with physical impairment; paleontology; and geography.

Discussion

In the opinion of this observer, the exercise results were extremely positive. Perhaps the results were caused by the novelty effect as Clark's 1983 writing would suggest, but the air seemed charged with excitement, engagement, and interest. The reader may be wondering what each teacher actually did in his or her classroom. There were four veteran teachers; the average years of experience was twenty. There was also a student teacher who had full planning and teaching responsibility for her section. The paper turns now to a short description of each teacher's classroom.

Math

The math instructor used the Mimi module entitled *Maps and Navigation*. The teacher followed the manual closely, having the students perform exercises involving, among other things, map making, measurement, distances, latitude/longitude, topographic maps, and triangulation. Math problems included ratios and time-distance problems. The latter supported work the students had been studying in their regular classes. During one exercise, the teacher went beyond the text's scenario by taking the students outside the school to estimate distances and determine azimuths (direction in degrees) by use of a compass. Both the teacher and the students were excited about this exercise. The instructor was overheard to say: "Golly, but it went well today--the kids loved it!" One female student remarked: **"This was just like in real life! It's something we don't have to learn for a test, then just forget!"**

Science

The science instructor used the Mimi module *Ecosystems*. The students studied food chains, food webs, and scientific methods. The students compared methods conducted by the

Mimi crew with those conducted in the forestry industry. They also had the opportunity to view and comment on some of the Mimi series' 13 videotape "expeditions" to places in which scientific activity was conducted. The students worked on group projects--conducting research in the library, then presenting a food chain depicted on a poster. There was also a written exit project for each student.

English

The English classes were divided into those taught by the regular teacher and those taught by the student teacher. The former started the students off by exploring the relationships of the crew members. She had the students keep daily journals--pretending to be an additional crew member. (The figure below contains a student's drawing of herself along with the rest of the Mimi's crew.)

The student teacher was fortunate in quickly finding a popular theme. One of the actors depicted in the series was hearing impaired. Once the student teacher found that some of her students were fully versed in sign language, she and the

By Erin Knocke, 7th Grade

other students commenced to learn the entire alphabet in sign language. Their efforts culminated in an entire class taught using signing. The students taught the class--dividing into groups to help one another. The observer was struck with the patience and tenacity of the student teaching groups during this exercise. Toward the end of the Mimi experience, the section was visited by a speech pathologist. She discussed language as well as testing for hearing impairment. The student teacher ended her exercise by playing "Jeopardy" using Mimi terms and vocabulary.

Social Studies

The social studies teacher had expressed her reservations of such a wide-open approach to the classroom, but was soon struck by the students' interest in various themes offered by the Mimi series. The class conducted research on endangered species. Next, the class looked at paleontology--evaluating evidence that whales had evolved from land mammals. This led to the review of other evolution--looking for example, at leopards in transitory forms of evolution. Codes were explored; the class deciphered coded written messages and took down messages flashed in Morse code. This class also explored two other major topics: first, the formation of land/water configurations such as deltas, straits, and bays; second, the influence of Indo-European languages and their various branches.

Attitudes Toward Math and Science

Why didn't the exercise produce a change in student attitudes toward math and science? Looking at Table 1 above, the reader can see that there appeared to be a very healthy attitude toward math, and there was little gender difference. There may be a number of reasons for the lack of difference between genders. First, many of the children in the sample group came from families whose parents are staff or faculty at Virginia Tech; others were the children of professionals from Blacksburg, Virginia. It seems likely that these students would be college bound and more interested in math and science. The shortness of this exercise may have also contributed to no significant changes in attitudes. Mimi support materials indicate that the exercise could last for a semester, but these teachers only had time for an abridged version. Anecdotal written comments from the students,

however, were extremely positive. The students were asked whether the next seventh grade class would profit from the Mimi series. Here are some examples of their comments:

- "...**I liked how all classes were incorporated with Mimi.**"
- "...it is educational, shows how important math and science are; it's an interesting way to do it..."
- "...it [helps] students open their eyes to what other areas of science, math, etc. there are."
- "It was different because the Mimi helped us **refer the things we learn to real life.**"
- "I enjoyed a lot of things in this but I think that **if anything should stay the same for sure, it should be that the sign language is taught again.**"
- "I would just like to thank the writers of this program because I had so much fun."

Another positive indicator was a question that asked the students what occupation(s) they had in mind. While not significant, there was a strong increase in selections of science teacher, marine biologist, and oceanographer.

Geography

One pleasant surprise to come out of the exercise was the unanticipated emphasis that developed in geography. Carstensen and Morrill (1992), in an unpublished paper dealing with a geography project at Virginia Tech, discuss the shortcomings of the nation's students in geography. They cite a need for students to have knowledge of the significance of location, the origins and development of places, and the consequences of the interactions between humans and the natural environment. In the opinion of this writer, the Mimi materials greatly facilitated addressing the types of knowledge discussed by Carstensen and Morrill. The students were learning geography while they were also engaged in the other disciplines.

Implications For Education

For those involved in educational research, the type of "anchored" environment looked at in this study provides lucrative areas for investigation. A particular challenge will be in developing appropriate evaluative tools conducive to constructivist environments. While this study took a "broad brush" look at the exercise, interesting areas for detailed scrutiny might include specific domain knowledge such as geography, science, or math. Others may be interested in the students' self esteem or stress levels. And there are always the issues of learning styles and learner differences.

Does the dramatic videotape series, *Voyage of the Mimi,* provide an effective vehicle for instruction? Yes. Within the concept of anchored instruction, it allows the instructor to pursue nearly all disciplines. It also provides the teacher with opportunities to take side trips into interesting and new areas while students are engaged in learning activities.

What did four veteran teachers think about the risk they took in using two weeks of their time to conduct this exercise? The reader can form his or her own opinion. The team plans to conduct the Mimi exercise during two weeks of the coming fall semester, and the school has purchased the series *The Second Voyage of the Mimi* for a two week exercise in the spring semester.

By Erin Knocke, 7th Grade

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